Historic, archived document

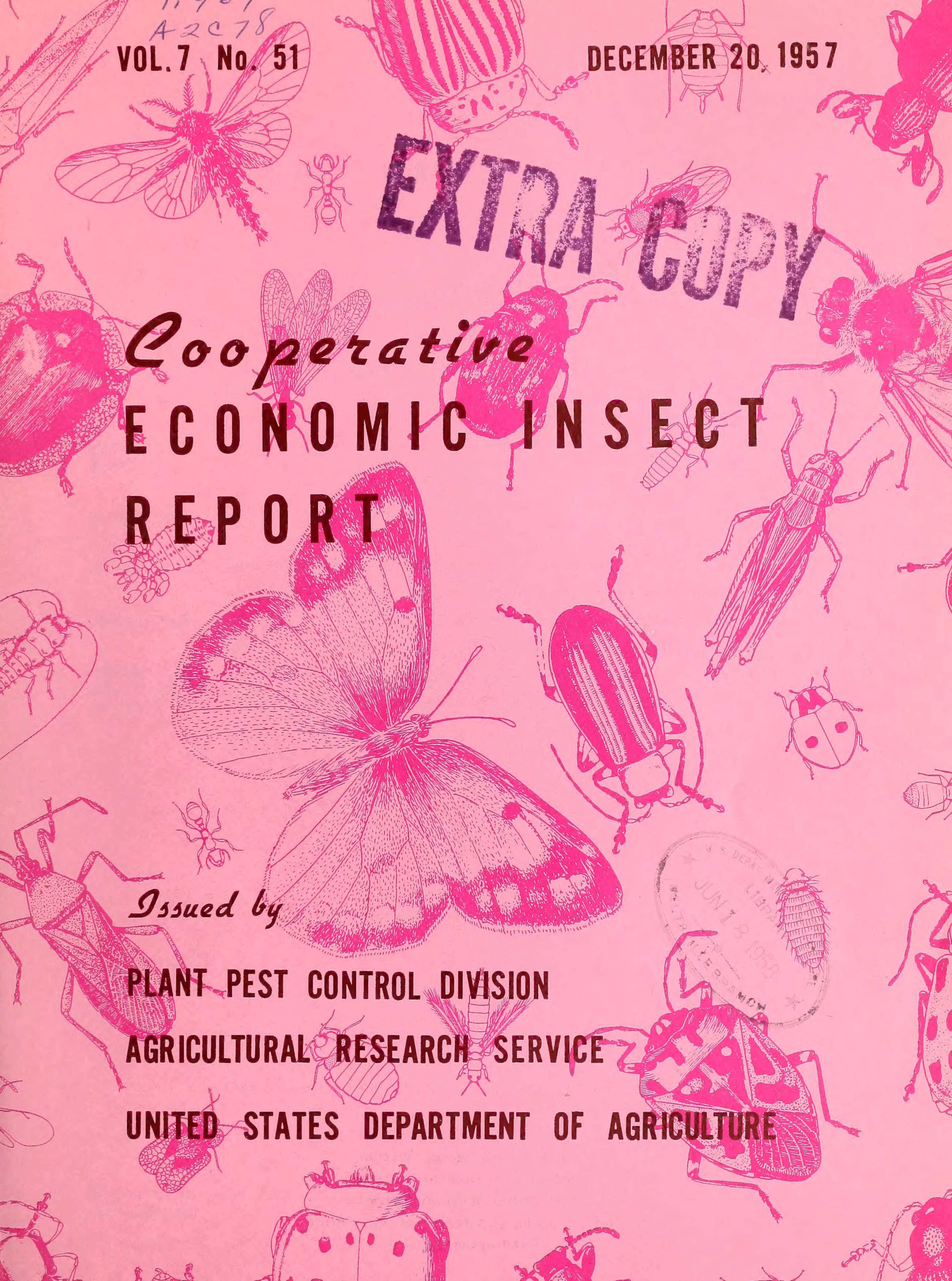
Do not assume content reflects current scientific knowledge, policies, or practices.

A2C78

VOL. 7 No. 51

DECEMBER 20, 1957

EXTRA COPY



Cooperative ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

JUN 18 1958

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

PLANT PEST SURVEY SECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

Reports and inquiries pertaining to this release should be mailed to:

Plant Pest Survey Section
Plant Pest Control Division
Agricultural Research Service
United States Department of Agriculture
Washington 25, D. C.

Volume 7 December 20, 1957 Number 51

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

Potential CHINCH BUG problem in Illinois expected to be light. (p.929)

KHAPRA BEETLE found for first time in Santa Cruz County, Arizona and two new infestations reported in California. (p. 932).

IMPORTED FIRE ANT reported for the first time in Gulf and Marion Counties, Florida and in Madison Parish, Louisiana. (p. 932).

Highlights of INSECT OCCURRENCES in Canada, 1957. (p. 933).

INSECTS not known to occur in the United States. (p. 935).

ADDITIONAL NOTES. (p. 932)

CORRECTION - Map showing spread of PINK BOLLWORM in the United States on page 937 replaces map on page 924, CEIR 7(50). Original map did not show spread in Arizona.

****

Reports in this issue are for the week ending December 13 unless otherwise designated.

WEATHER BUREAU 30-DAY OUTLOOK

MID-DECEMBER 1957 TO MID-JANUARY 1958

The Weather Bureau's 30-day outlook for the period mid-December to mid-January calls for temperatures to average above seasonal normals over most of the nation east of the Continental Divide except for near normal over the northern tier of states and in the extreme southeast. Below normal temperatures are expected over central and northern areas west of the Divide, with near to above normal in southern portions. Precipitation is expected to exceed normal west of the Continental Divide and also over the northern third of the country. Subnormal amounts are indicated over the southern third of the nation east of the Divide. In remaining areas near normal amounts are in prospect.

Weather forecast given here is based on the official 30-day "Resume and Outlook", published twice a month by the Weather Bureau. You can subscribe through Superintendent of Documents, Washington 25, D. C. Price $4.80 a year, $2.40 a half year.

WEATHER OF THE WEEK ENDING DECEMBER 16

A midweek cold wave highlighted the week's weather east of the Rocky Mountains. First felt in north-central areas on the 10th, the rapidly moving blast of cold Arctic air covered the entire eastern United States early on the 12th. It whipped up dust in the western Great Plains and reduced temperatures to subzero levels in the North and to subfreezing levels in the Deep South. Freezing was widespread in Texas and the second major freeze of the season to hit the southern vegetable growing area of that State where minima dropped to the middle 20's. Citrus harvest will be delayed for several days until freeze damage can be determined. In Florida, low readings on the 12th and 13th, ranging from 12° to 27° in the north and 32° to 37° in the Everglades, approximated those of the more recent historic freezes of December 1934 and January 1940. In the central portions of the Peninsula including the west coast, temperatures of 26° or lower persisted from 5 to 11 hours. Winds made protective measures difficult. Citrus, truck, sugarcane, and shrubbery all suffered losses, the extent of which is not yet determined. Another important feature of the week's weather was the moderate to heavy precipitation the first part of the period along the north Atlantic coast which greatly improved soil moisture and water supplies. Precipitation since November 1 now totals 9 inches at Boston, Mass., and 8.56 and 7.92 inches at Middletown and Hartford, Conn., respectively. Last week's precipitation totaled 2.03 inches at Atlantic City, N. J., and averaged about 1.25 inches for that State.

The cold wave was preceded and followed by unseasonably mild temperatures, with little or no precipitation other than along the middle and north Atlantic coast. Dry weather and frozen ground were favorable for completion of late harvesting operations in many mid-continent areas. Temperatures were unusually mild in the Far West, except in California's Central Valley where they were well below normal. Average departures from normal ranged from 12° above in the central and northern Rockies to 6° below normal in the San Joaquin Valley. Measurable precipitation fell at nearly all stations west of the Divide on the 14th or 15th. Totals exceeded 1 inch in portions of middle and northern California and in coastal areas of Washington and Oregon. On the 11th snow fell over the Appalachian region and Northeast and in local areas of the Ohio Valley and Great Lakes region. Falls ranged from 5 to 7 inches in northern New England, 2 to 7 inches in Connecticut and interior New Jersey, and 4 to 8 inches in eastern New York State. In New York's Hudson Valley, glaze occurred on 2 days early in the week. Warmer weather over the weekend melted virtually all the snow cover, except in some interior areas of New York and New England and the extreme upper Great Lakes region. The ground remained bare all week in the Great Plains. (Summary supplied by U. S. Weather Bureau).

CEREAL AND FORAGE INSECTS

GRASSHOPPERS - ILLINOIS - During 1957, there were approximately 10,623 acres of cropland and 12,255 acres of fence rows treated for control. In western area, 5,094 acres of fence rows were treated and only 36 in southeastern area, and in the central area 2,538 acres of cropland were treated and in southeastern area 58 acres were treated. This is the maximum and minimum acreages. Other sections range between these figures. Savings on actual cropland treated added to protection supplied by fence row, roadside and ditch bank treating is believed to have saved $114,390. (Ill. Ins. Rept.). NEVADA - Egg survey shows considerable parasitism in northeastern Elko County. COLORADO - Survey in seven eastern counties in November showed average of 8.7 percent marginal injury in fall-planted wheat. Total estimated loss in area was 54,101 acres. This type of injury is more widespread and more severe this season than from many years and has resulted in very serious losses. Second-generation Melanoplus bilituratus has been responsible for most of the damage in eastern Colorado. (PPC, West. Reg.). MINNESOTA - Egg survey in Koochiching, Itasca and Lake of the Woods Counties shows more egg pods present than adult survey indicated. M. bivittatus dominant in most areas. WISCONSIN - Clark and Taylor Counties only areas with significant number of eggs. (PPC, Cent. Reg., Nov. Rept.).

WINTER GRAIN MITE (Penthaleus major) - OKLAHOMA - Severe damage to a 30 acre field of oats in Jackson County. Populations up to 200 mites per linear foot of row were present. Control measures have been initiated. (Coppock, Hatfield).

APHIDS - SOUTH CAROLINA - Moderate on barley in Hampton, Lee, Orangeburg, Darlington, Dillon, Sumter and Marlboro Counties. (Nettles et al.).

CHINCH BUG (Blissus leucopterus) - OKLAHOMA - Number of hibernating bugs per square foot averaged 85 in Jackson County and 3,903 in Comanche County. (Fed.-State Chinch Bug Survey). ILLINOIS - Infestations were limited in 1957 to a few areas that were missed by the heavy spring and summer rains. Some fields of small grains were sprayed and in some cases chinch bugs attacked small corn. Total acreage treated was 4,598 acres while only 200 acres of crops were estimated to have been destroyed. Savings above treatment costs were estimated at $18,392. Compared with previous years, the potential chinch bug problem in 1958 is the mildest in several years. It is noticeable that the severity has been decreasing each year since 1954. Unless weather in late May, June and July is extremely favorable to chinch bugs, no problems are anticipated. The center of the infestation is an elliptical area extending from McDonough County to Vermilion and Edgar Counties. Piatt County was the only county in which the rating was very severe and in Fulton County the rating was severe. (Ill. Ins. Rept.).

ARMYWORM (Pseudaletia unipuncta) - ILLINOIS - Distribution was general throughout southern two-thirds of State during spring and early summer of 1957 in grass and grain fields. No general outbreaks occurred and no treatments of any consequence were required for control. (Ill. Ins. Rept.).

CORN LEAF APHID (Rhopalosiphum maidis) - OKLAHOMA - Numerous on volunteer barley in Garfield, Kingfisher and Canadian Counties. Also common in planted barley adjacent to volunteer fields. (Coppock).

GREENBUG (Toxoptera graminum) - OKLAHOMA - Occasional specimens collected from volunteer oats in Canadian County. (Coppock).

SUGARCANE BORER (Diatraea saccharalis) - FLORIDA - Infesting sweet corn near Punta Gorda, Charlotte County. (H. Denmark).

SPOTTED ALFALFA APHID (Therioaphis maculata) - UTAH - Continues to be numerous on alfalfa in Kanab area of Kane County. (Knowlton). OKLAHOMA - Decreased to very low numbers in all areas of State; unable to find in many fields. (Coppock).

A STEM MAGGOT (Meromyza pratorum) - WASHINGTON - Adult reared from pupa collected on winter wheat at Quincy, June 6, 1957. Caused dwarfing of plant and white head. Very rare occurrence. (Dailey).

WHITE-FRINGED BEETLES (Graphognathus spp.) - NORTH CAROLINA - Surveys were made in 13 counties during November. Extensions were found in 7 counties, and 1,095 additional acres found infested, 698 of which were in Stanly County. (PPC, Sou. Reg.).

SOYBEAN CYST NEMATODE (Heterodera glycines) - MISSOURI - Twenty-one additional infested fields found in Pemiscot County and one in New Madrid County during November. For the State, this makes a total of 78 properties in Pemiscot, 6 in New Madrid and one in Stoddard County. (PPC, Cent. Reg.). ARKANSAS - Soil samples were collected in Clay, Craighead, Cross, Greene, Poinsett and Randolph Counties involving 6,599 acres. No additional infestations found. MISSISSIPPI - Soil samples were collected in Bolivar, De Soto, Tunica and Washington Counties, totaling 439 acres. No infestations were found. TENNESSEE - Limited surveys were made in Dyer, Lake, Obion, Gibson and Lauderdale Counties. One additional infestation found in Lake County and one in Obion County, totaling 95 acres. (PPC, Sou. Reg., Nov. Rept.).

FRUIT INSECTS

MEXICAN FRUIT FLY (Anastrepha ludens) - TEXAS - In the citrus producing counties of lower Rio Grande Valley, 2,184 traps were operated during November. No positive finds. (PPC, Sou. Reg.).

MEDITERRANEAN FRUIT FLY (Ceratitis capitata) - During November, trapping continued with 14 traps in operation in Baldwin County and 8 traps in Mobile County, ALABAMA; 47 traps in Gulfport district of MISSISSIPPI. All trapping operations in Alabama, Mississippi and Louisiana were negative. At the close of November, 23,846 traps were in operation in FLORIDA. A summary of activities at the end of November in that State shows that 800,423 acres were treated one or more times, 4,300 acres were under treatment review, and 6,764,898 aggregate acres have been treated since the beginning of the program. On November 6, four flies were trapped at Rocky Bluff, and on November 26, two flies were picked up on Sneads Island, both collections in Manatee County. (PPC, Sou. Reg.).

AN ERIOPHYID (Aceria litchii) - FLORIDA - Survey conducted in four lychee groves in vicinity of known infestation at Nokomis, Sarasota County, revealed no new mite infestations. Mites were found on two additional trees in the infested grove. (H. Denmark).

BURROWING NEMATODE (Radopholus similis) - FLORIDA - Surveys were made during November of 67 citrus groves, 14 of which were found infested for the first time. Surveys of 152 citrus nurseries revealed 10 new infestations and of 11 ornamental nurseries 5 new infestations were found. One avocado grove, also, was found infested for the first time. (PPC, Sou. Reg., Nov. Rept.).

TRUCK CROP INSECTS

SWEETPOTATO WEEVIL (Cylas formicarius elegantulus) - Infestations were found for the first time in Wayne County, GEORGIA; Webster Parish, LOUISIANA and Neshoba County, MISSISSIPPI. The latter infestation was found during October and the other two during November. Surveys were also conducted in 103 counties in ALABAMA, FLORIDA, GEORGIA, LOUISIANA, MISSISSIPPI and SOUTH CAROLINA. These revealed 328 new infestations in 48 counties, all of which, with the exception of the three counties noted above, were in counties previously known to be infested. (PPC, Sou. Reg., Nov. Rept.).

BEAN LEAF ROLLER (*Urbanus proteus*) - FLORIDA - Larvae averaged 3 per plant on 50 bean plants inspected at Plant City, Hillsborough County. (Lowe, Nov. 12).

BEET LEAFHOPPER (*Circulifer tenellus*) - CALIFORNIA - Native vegetation in northern district of control area drying rapidly. Highest population near Los Banos, Merced County. Leafhoppers in Ingram Canyon, Stanislaus County, ranged from one to three per 10 sweeps. Should vegetation continue to dry, leafhoppers will concentrate on the greener vegetation in the swales. (Cal. Coop. Rept.).

FIELD CRICKET (*Acheta assimilis*) - CALIFORNIA - Based on figures by the Imperial County Agricultural Office, damage to crops in Imperial County would have exceeded 36.5 million dollars if *A. assimilis* had not been controlled. (Cal. Coop. Rept.).

TWO-SPOTTED SPIDER MITE (*Tetranychus telarius*) - WASHINGTON - Populations varying from trace to heavy in peppermint fields in lower Yakima Valley and Quincy area during July and August. Peppermint easily damaged by this mite, causes browning of leaves. Heavily infested fields have burned appearance. (Frick).

AN APHID (*Anuraphis menthae-radicis*) - WASHINGTON - Very light infestation of adults and nymphs on peppermint roots at Grandview, August 15. (Frick).

COTTON INSECTS

PINK BOLLWORM (*Pectinophora gossypiella*) - CALIFORNIA - Final boll inspections completed in Kings and Tulare Counties. Total bolls examined in these surveys numbered 10,000 and 21,700 respectively. No pink bollworm was found. (Cal. Coop. Rept.). OKLAHOMA - Thirty lint cleaners and 22 gin stands inspected in 14 cotton producing counties; a total of 229 pink bollworm larvae found. (Fed.-State PBW Comm., Dec. 4). FLORIDA - In Monroe County, 634 hibiscus blooms were inspected at previously known infested areas. Sixty-four pink bollworms were found. ARKANSAS - Inspections were made of 5,381 bushels of gin trash from 38 counties. Lint cleaner and boll inspections were also made. All inspections during November were negative. TENNESSEE - Gin trash inspections were made of 515 bushels of trash collected in Shelby, Tipton, Haywood, Fayette, Hardeman and McNairy Counties. All inspections were negative. (PPC, Sou. Reg., Nov. Rept.).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

A NOTODONTID (*Datana robusta*) - CALIFORNIA - Defoliating sumac plants in coastal San Diego County. (Cal. Coop. Rept.).

LOCUST BORER (*Megacyllene robiniae*) - UTAH - Damaging shade locust trees at a Salt Lake residence. Common occurrence. (Knowlton).

ORANGE TORTRIX (*Argyrotaenia citrana*) - WASHINGTON - Rather extensive infestation on carnations in greenhouse at Sumner. Two year old plants most seriously affected. (Doucette).

INSECTS AFFECTING MAN AND ANIMALS

CATTLE LICE - UTAH - Problem in many localities in Beaver, Garfield, Grand, Emery, Duchesne, Piute, Kane and Wasatch Counties. (Knowlton).

STORED-PRODUCT INSECTS

BLACK CARPET BEETLE (*Attagenus piceus*) - WASHINGTON - Light infestation of larvae in floor debris in feed mill warehouse in Walla Walla, November 19. (Walker).

KHAPRA BEETLE (*Trogoderma granarium*) - ARIZONA - Infestation found in rural store at Amado; first record for Santa Cruz County. Infested premises have now been found in 9 of Arizona's 14 counties (to November 30). (PPC, West. Reg.). CALIFORNIA - Two new infestations reported during week. One in Bodfish, Kern County; heavy on Sudan grass seed. Second infestation in Bard, Imperial County; light on feed sacks and macaroni. (Cal. Coop. Rept.).

DERMESTIDS - NEBRASKA - Dermestids infesting a CCC bin of wheat at Odell determined as an aberrant form of *Trogoderma glabrum*. (PPC, Cent. Reg., Nov.). WASHINGTON - Light infestation of *T. inclusum* larvae in barley waste in feed mill at Walla Walla, November 19. (Walker).

MISCELLANEOUS INSECTS

IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) - FLORIDA - Infestations found near Wewahitchka, Gulf County and Fellowship, Marion County. These are first reported finds in Gulf and Marion Counties. (H. Denmark). LOUISIANA - Positive identifications received of specimens collected in Madison Parish. TENNESSEE - Inspections through southern part of Shelby County were negative. TEXAS - A detailed survey was begun in seven counties adjoining six known infested counties in southeastern area of State. (PPC, Sou. Reg., Nov. Rept.).

LIGHT TRAP COLLECTIONS

	Agrotis ypsilon	Feltia subterranea
SOUTH CAROLINA (County)		
Oconee 12/7-13	1	
FLORIDA		
Gainesville 12/3	1	
Quincy 12/3		5
Monticello 12/3-4		2

ADDITIONAL NOTES

PENNSYLVANIA - GARDEN FLEAHOPPER caused quite extensive damage to tomatoes in Franklin County in July, 1957. (Kreiner). CLOVER MITE was very abundant on house in south central area on December 3. (Pepper). PITCH TWIG MOTH infesting entire plantation of red pine in Schuylkull County, December 6. (Menusan).

HIGHLIGHTS OF INSECT OCCURRENCES - 1957

CANADA

Prepared by C. G. MacNay

A major factor affecting insect abundance and damage in Canada in 1957 was the unusual variation in rainfall. In Manitoba heavy rains greatly reduced GRASSHOPPER abundance and in Saskatchewan fine weather at hatching favored unexpectedly large numbers. After the heavy rains associated with hurricane Audrey at the end of June in the east, there were drought conditions in many regions of both east and west. Probably associated with these weather conditions were large populations of APHIDS from coast to coast, notably on trees in the west, and unusual injury by the SIX-SPOTTED LEAFHOPPER (*Macrosteles fascifrons*), RED-BACKED CUTWORM (*Euxoa ochrogaster*), and WHITE GRUBS.

In the interior of British Columbia, GRASSHOPPERS were slightly more numerous than in 1956 and control measures were necessary in the Okanagan and Thompson Valleys, where fruit and vegetables were attacked. They caused little damage in Alberta, but in south central and extreme southern agricultural regions of Saskatchewan an unexpected increase caused moderate losses, especially in flax. In southern Manitoba, although heavy rains checked hatching and favored development of disease organisms and lush plant growth, sufficient numbers survived to cause extensive damage in gardens, field margins, pastures, and meadows.

As usual, CUTWORMS were generally injurious, but an outbreak of the RED-BACKED CUTWORM from British Columbia to Saskatchewan was the worst in several years. In the interior of British Columbia this pest attacked vegetable and flower gardens, alfalfa, and grain. In Alberta and Saskatchewan, local losses in grain ranged from 50 to 100 percent. Severe damage in foothills and parkland was a new feature for the species. ARMY CUTWORM (*Chorizagrotis auxiliaris*) was moderate in southern Alberta, but larvae developed early and much damage was averted by delayed seeding. In Eastern Canada ARMYWORM (*Pseudaletia unipuncta*) damaged grain, hay, corn, and pastures in every province, severe local outbreaks occurring in southern Ontario, Quebec, New Brunswick and Newfoundland.

A very severe infestation of second-year WHITE GRUBS occurred in all agricultural areas of Ontario excepting the Niagara Peninsula and extended into southern Quebec and New Brunswick. Damage to all host crops was severe and in eastern Ontario was accentuated by drought. Skunks fed extensively on the grubs, causing further damage to permanent sod.

A general outbreak of SIX-SPOTTED LEAFHOPPER caused severe damage to flax, carrots, beets, lettuce, corn, potatoes, and celery in the Prairie Provinces and Ontario; yellows and purple top were very common. Local outbreaks of BEET WEBWORM (*Loxostege sticticalis*) damaged rape flax in Alberta and Saskatchewan, the infestation in the latter province being the heaviest in several years. PAINTED-LADY (*Vanessa cardui*) was unusually numerous from Manitoba to Nova Scotia, the damage in Manitoba being extensive in sunflowers and sugar beets. Unusually large numbers of the ZEBRA CATERPILLAR (*Ceramica picta*) fed on various hosts in Ontario. SOD WEBWORMS heavily infested grassland in the Fraser River Valley, B. C., and pastures in Prince Edward Island. PEA APHID (*Macrosiphum pisi*) was very injurious to alfalfa on irrigated land in Alberta. Damage by WIREWORMS and ROOT MAGGOTS was generally much lighter than usual, partly because of improved control measures.

Some pests also caused notable injury to vegetables. ALFALFA LOOPER (*Autographa californica*) severely damaged lettuce at Cloverdale, B. C. APHID populations on potato in New Brunswick were the largest in several years. The area infested by CARROT WEEVIL (*Listronotus oregonensis*) in the Holland Marsh, Ont., increased from 150 acres in 1956 to 300 acres. An unusual infestation of COLORADO POTATO BEETLE (Leptinotarsa decemlineata) on 10 acres of tomatoes in Kent County, Ont., required control measures. Populations of POTATO LEAFHOPPER (Empoasca fabae) on potatoes, beans, and alfalfa were the largest in several years in southwestern Ontario. POTATO STEM BORER (Hydroecia micacea) was unusually abundant in corn, tomatoes, potatoes, and rhubarb in Eastern Canada. SQUASH VINE BORER (Melittia cucurbitae) was very numerous in southwestern Ontario. SLUGS were very injurious to corn, timothy, and vegetables in Ontario, after heavy rains associated with hurricane Audrey. NEMATODES were recorded for the first time as pests in market gardens in irrigated areas of Alberta and on onions in southern Ontario.

Damage by fruit insects was highlighted in British Columbia by a heavy infestation of various SOFT SCALES on apricots and peaches in the Okanagan Valley and an unprecedented infestation of cane fruits by RASPBERRY CANE MAGGOT (Pegomya rubivora) in coastal areas. In Ontario, parasitism of ORIENTAL FRUIT MOTH (Grapholitha molesta) by Macrocentrus ancylivorus was unusually high; GRAPEVINE APHID (Aphis illinoisensis) heavily infested grape in Lincoln County, after extreme scarcity for 30 years; and AN APHID appearing on apple in recent years was identified as Ovatus sp. near crataegarius. Insects recorded as pests of strawberry for the first time included lepidopterous larvae in stems and fruit in coastal British Columbia, Harpalus rufipes feeding extensively on fruit at Medord, N. S., and Cnephasia virgaureana infesting plants in Newfoundland.

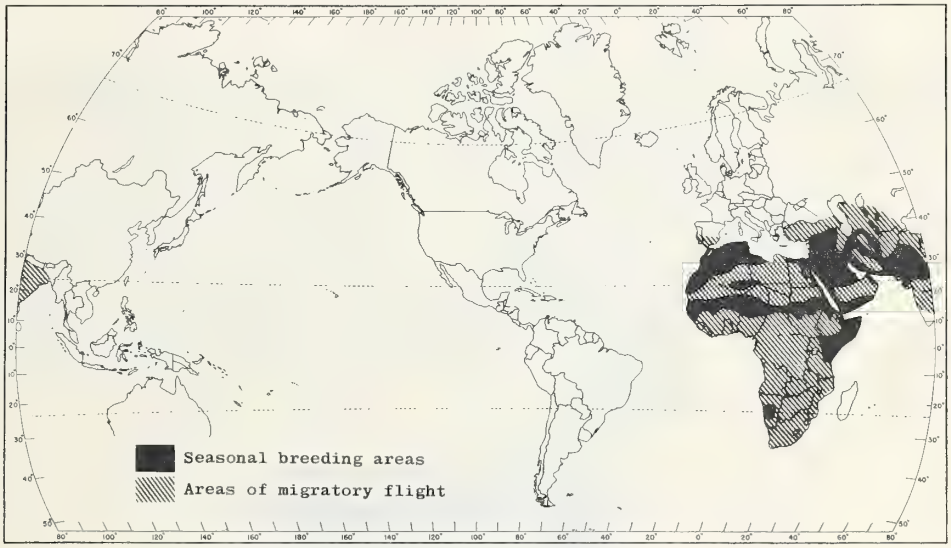
Other newsworthy items included; paralysis of 342 head of livestock and the death of 40 at Kamloops, B. C., caused by the ROCKY MOUNTAIN WOOD TICK (Dermacentor andersoni); and first records of the LILAC LEAF MINER (Gracilaria syringella) at Lethbridge, Alta., of A SPIDER BEETLE (Ptinus raptor) in Saskatchewan, and of Musca autumnalis in Quebec.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

DESERT LOCUST (*Schistocerca gregaria* (Forskal))

Economic Importance: Plagues of this locust have been known throughout the Middle East and Africa since early Biblical times. Damage has been extensive in many areas although the frequency of attacks is largely dependant on ecological and meteorological conditions. Normally attacks occur only about once in 10 years in Egypt. Losses on sorghum caused by the migratory phase in the Sudan in 1936 were estimated at 50,000 tons and an estimated 1,235,000 acres of crops in French North Africa, valued at 100 million francs, were destroyed in 1929 and 1930. Swarms were very numerous in Iran and India during 1951 and 1952 and in the latter country the swarms covered over 100 square miles with one egg field extending over 150 square miles. Costs of the control campaign in 1954 and 1955 amounted to about 1,300,000 dollars and the campaign in 1955 and 1956 to about 1,500,000 dollars.

Hosts: Attacks many cultivated and wild hosts, the most important being alfalfa, tobacco, sorghum, millet, beans, sugarcane, cotton, citrus and small grains.

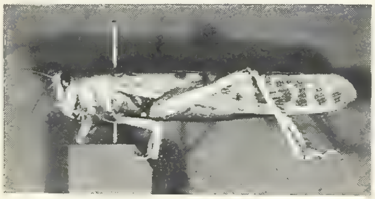


General Distribution of Desert Locust

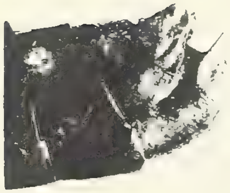
Distribution: The migratory forms invade large areas covering most of Africa and the Middle East. Generally, limits of migrations are east to the Bay of Bengal in India, as far north as the Aral Sea in USSR and southern Spain in Europe, although isolated specimens have been collected as far north as Scotland. The species has also been reported in Zanzibar, Canary Islands and the Azores.

Life History and Habits: Average life of adult male is about 80 days, adult female about 68 days in Egypt. Oviposition takes place in cultivated and desert areas, preferably in sandy soil. Breeding rarely occurs south of latitude 12° north. Females deposit from 1 to 6 egg pods with number of eggs per pod averaging between 28 and 59. The incubation period requires 27 to 43 days in February and March and 15 days in April and May. Young locusts in the migratory phase display gregarious instincts from the beginning and march in column, not in line. The nymphal stages require about 45 days in winter. There are normally 5 instars, sometimes more. As they advance in age, nymphs become more voracious. The desert locust exists in two extreme forms or phases, one typically swarming (phase gregaria) and the other typically solitary (phase solitaria). The intermediate phase or form is transiens. The difference between the two phases lies in the habits and morphological characteristics of the adults and the color and habits of the nymphs. Under favorable conditions 3 generations a year may be produced. There is no diapause in any stage of development. Invasions of migratory locusts are always characterized by irregular fluctuations rather than a regular periodicity. The morphological distinctions between the two phases are noted in the description. The migratory phase exhibits the characteristics of the phase when and where the density of the populations makes it possible. The grasshoppers living in isolation cannot retain these characters and acquire those of the solitary phase. This transforation is not immediate, but may extend over one or more generations, hence intermediate forms are common. Young swarms of migratory forms leave the breeding areas in East Africa in October and breed during winter rains on the coasts of the Red Sea. Grasshoppers from this brood later migrate inland where another generation is produced. This brood returns to breeding grounds in East Africa for the summer rains. The same general pattern is true in western North Africa. The insects breed during winter and spring in Algeria, Tunisia and Morocco and then migrate to Sudan, French West and Equatorial Africa for the summer rains. Breeding during the summer rains also takes place in northwestern India and Pakistan.

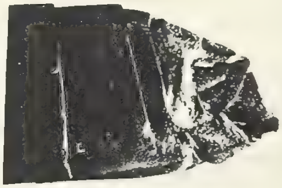
Description: The differences between phase gregaria and solitaria are as follows. The gregaria form - recently molted adults pale-pink gradually changing into red when in migration flight. Sexually mature males bright yellow while females slightly yellow, especially on head, thorax, basal part of elytra and legs; abdomen slate. Pronotal keel less distinct and surface of pronotum almost smooth. Earlier stages black, gradually changing into black with orange, red and yellow combination. Nymphs exhibit gregarious habit from beginning and form dense bands which move in masses. The solitaria form - recently molted adults greenish and later becoming grayish. Sexual maturity attained without any change in color. Pronotal keel more developed. Pronotum more distinctly sculptured. Nymphs uniformly green, with faint traces of black markings, rarely fawn or dark waxy green. Nymphs generally not gregarious, even when they exhibit a tendency towards gregariousness they do not move in masses. (Prepared in Plant Pest Survey Section in cooperation with other ARS agencies.) CEIR 7 (51) 12-20-57



Adult of Schistocerca gregaria



Posterior of Male

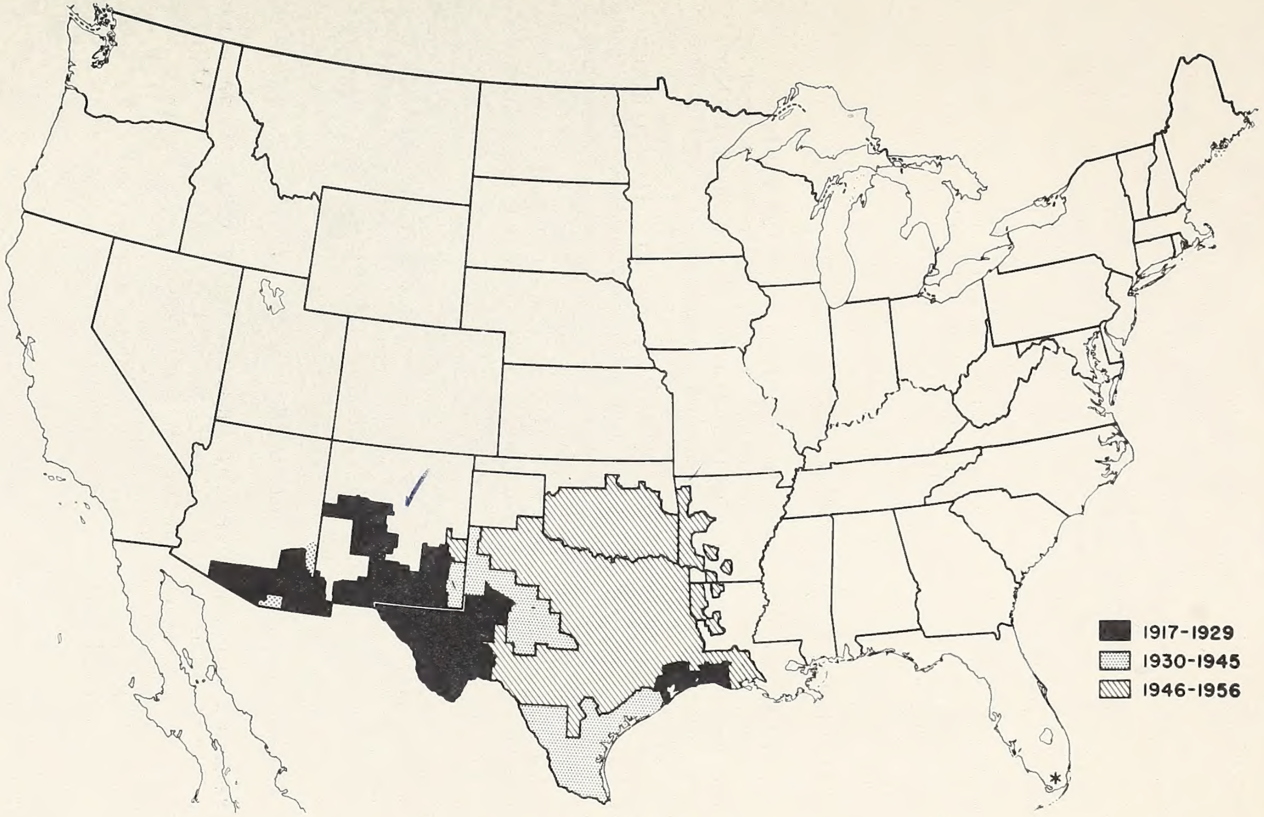


Posterior of Female

Figures of posterior end of abdomen of male and female from Faure, J. C. 1932. Bul. Ent. Res. 23(3):293-405. Figure of adult--USDA photograph.

SPREAD OF PINK BOLLWORM

1917 - 1956



* Occurs in Wild Cotton

Prepared in ARS, USDA, 1957
Replaces map issued in CEIR
7(50):924, December 13, 1957